Spot Safety Project Evaluation

Project Log # 200501249

Spot Safety Project # 07-97-202

**Spot Safety Project Evaluation, of the Flashing Traffic Signal Installation,
At the Intersection of NC 49 and SR 1157-SR 2317-Whites Kennel Road-Monroe Holt Rd,
Near Burlington, Alamance County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 04/12/2005
Carrie L. Goodrich Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 07-97-202 – The Intersection of NC 49 and SR 1157-SR 2317-Whites Kennel Road-Monroe Holt Rd, near Burlington, Alamance County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis and an Odds Ratio comparison analysis of the treatment data has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an overhead flashing traffic signal. V.E. Barham, Division Traffic Engineer, originally requested the improvements. NC 49, SR 1157-Whites Kennel Road, and SR 2317-Monroe Holt Road are all two-lane facilities with a speed limit of 45 mph at the treatment intersection. The subject location is controlled by stop signs on SR 1157-Whites Kennel Road and SR 2317-Monroe Holt Road. The initial crash analysis for this location was completed from October 1, 1993 through September 30, 1996 with a total of ten reported crashes (including eight Angle crashes). The final completion date for the improvement at the subject intersection was on August 10, 1998.

Comparison Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from July 1, 1998 through September 30, 1998. The before period consisted of reported crashes from September 1, 1992 though June 30, 1998 (5 Years, 10 Months) and the after period consisted of reported crashes from October 1, 1998 through July 31, 2004 (5 Years, 10 Months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The analysis also consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of all crashes within 150 feet of three intersections located near the treatment intersection. The three intersections that comprise the comparison data are as follows:

NC 49 at SR 1136-Bellemont Mount Hermon Rd-Bellemont Alamance Rd
NC 49 at SR 1130-Friendship Patterson Rd
NC 49 at SR 1117-SR 2365-Friendship Creek Rd-Coble Mill Rd

Please see attached *Location Map* for further detail. The following data table depicts the Naive Before and After Analysis for the treatment and comparison intersections. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information

	Before	**After**	**Percent Reduction (-)/ Percent Increase (+)**
Total Crashes	18	15	- 16.7
Total Severity Index	11.48	4.95	- 56.9
Frontal Impact Crashes	13	9	- 30.8
Frontal Severity Index	14.37	4.29	- 70.1
Volume	7900	8700	10.1

Comparison Information

	Before	**After**	**Percent Reduction (-)/ Percent Increase (+)**
Total Crashes	31	29	- 6.5
Total Severity Index	13.41	3.81	- 71.6
Frontal Impact Crashes	22	16	- 27.3
Frontal Severity Index	14.03	5.16	- 63.2
Volume	5600	6900	23.2

Odds Ratio: Treatment versus Comparison

	Before	**After**	**Percent Reduction (-)/ Percent Increase (+)**
Treatment Total Crashes	18	15	---
Comparison Total Crashes	31	29	- 10.9 %

The naive before and after analysis at the treatment location resulted in a 16.7 percent decrease in Total Crashes, a 56.9 percent decrease in the Total Severity Index, and a 10.1 percent increase in Average Daily Traffic (ADT). The comparison locations experienced a 6.5 percent decrease in Total Crashes, a 71.6 percent decrease in the Total Severity Index, and a 23.2 percent increase in ADT. The before period ADT year was 1995 and the after period ADT year was 2001.

The Odds Ratio is used as another means of calculating the treatment effect. The number of crashes in the before and after period from the Comparison are used to calculate the percent reduction in crashes for the Treatment Intersection. As shown in the previous table, using the Odds Ratio calculation, there is a 10.9 percent decrease in Total Treatment Intersection crashes.

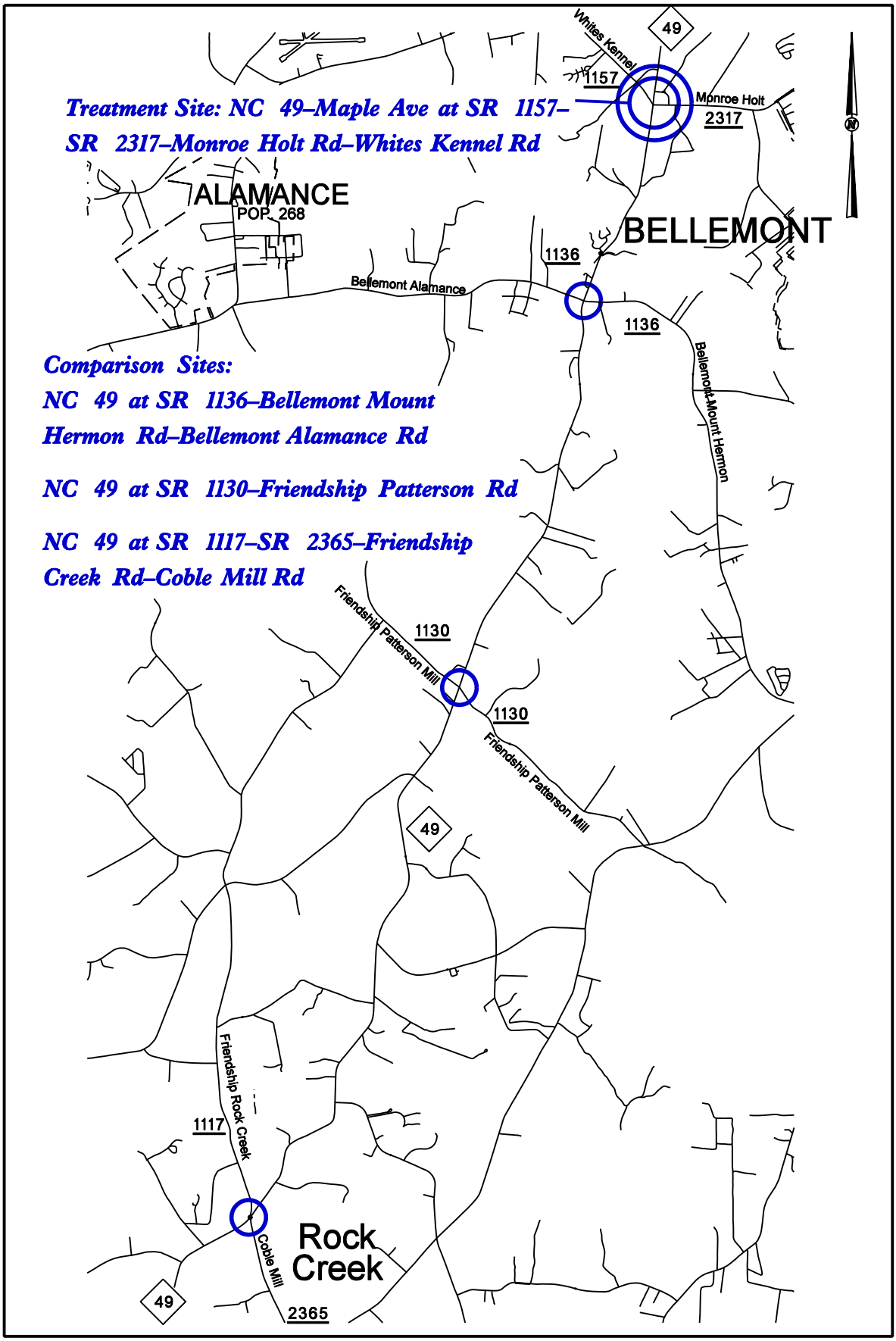
Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 16.7 percent decrease in Total Crashes and a 30.8 percent decrease in Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in a 10.9 percent decrease in Total Crashes at the Treatment Intersection. The summary results above demonstrate that the treatment location appears to have had an decrease in the number of Total Crashes and a decrease in the number of Frontal Impact Crashes from the before to the after period. Please see the attached Treatment Site Photos. Photos are provided for each leg of the intersection.

The countermeasure crash reduction for Total Crashes at the subject intersection can be in the range of a 10.9 percent decrease to a 16.7 percent decrease in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection is a 30.8 percent decrease in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors.

Evaluation of Spot Safety Project Number 07–97–202

Location Map, near Burlington, Alamance County



location map.dgn 11/08/2005 05:11:47 PM

Treatment Site Photos (Taken on March 11, 2005)

Looking north on NC 49

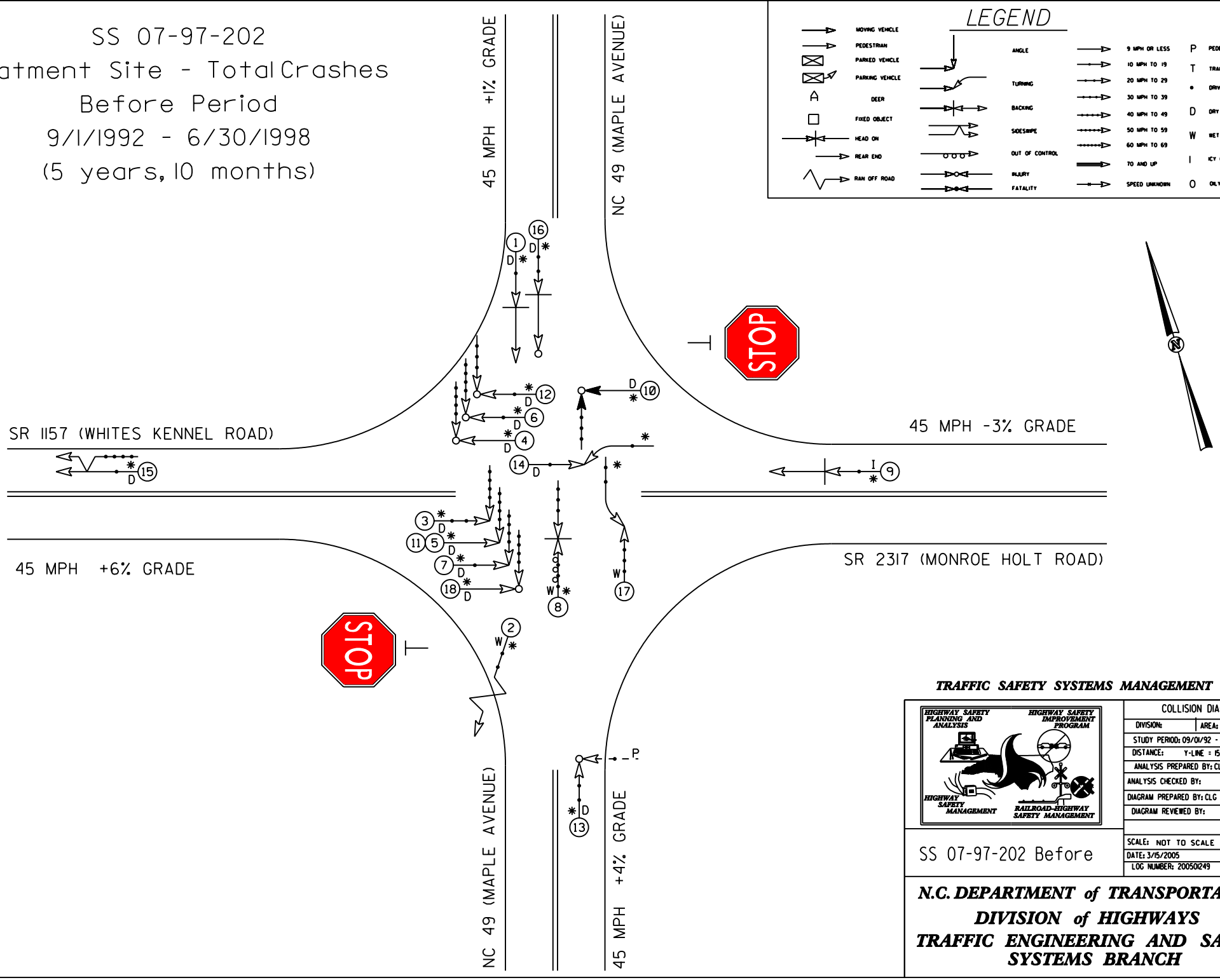
Looking south on NC 49

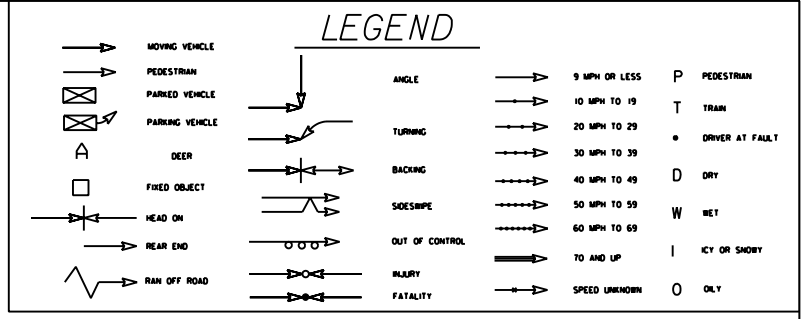
Treatment Site Photos (Taken on March 11, 2005)

Looking east on SR 1157-Whites Kennel Rd

Looking west on SR 2317-Monroe Holt Rd

SS 07-97-202
Treatment Site - Total Crashes
Before Period
9/1/1992 - 6/30/1998
(5 years, 10 months)





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM	
DIVISION:	AREA:
STUDY PERIOD: 09/01/92 - 06/30/98	
DISTANCE: Y-LINE = 150 ft	
ANALYSIS PREPARED BY: CLG	
ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: CLG	
DIAGRAM REVIEWED BY:	
SS 07-97-202 Before	SCALE: NOT TO SCALE
	DATE: 3/15/2005
	LOG NUMBER: 20050249

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

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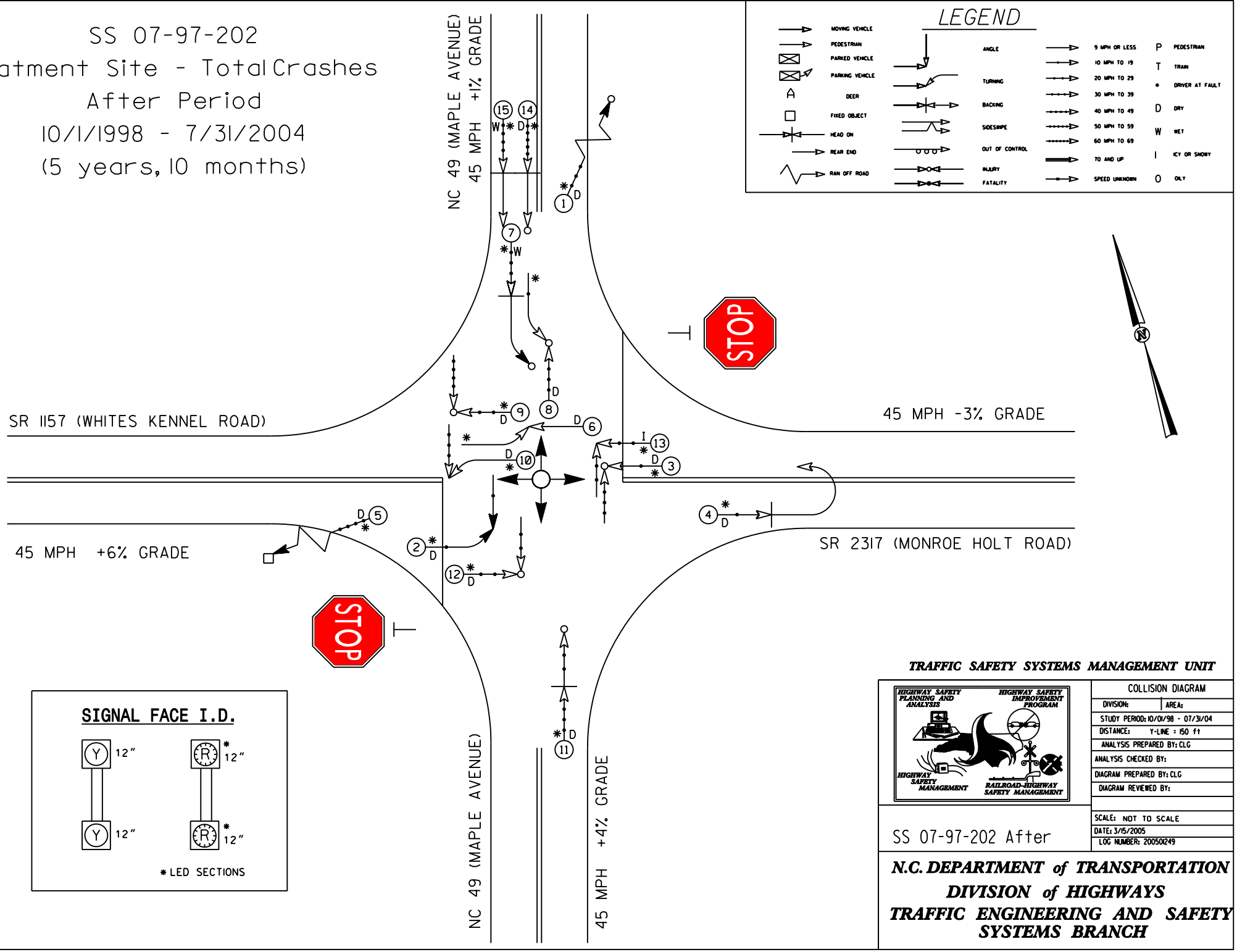
SS 07-97-202
Treatment Site - Total Crashes
After Period
10/1/1998 - 7/31/2004
(5 years, 10 months)



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
DEER
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN

P PEDESTRIAN
T TRAIN
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
O OILY

SIGNAL FACE I.D.

Y 12"
Y 12"
R * 12"
R * 12"

* LED SECTIONS

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY PLANNING AND ANALYSIS
HIGHWAY SAFETY IMPROVEMENT PROGRAM
HIGHWAY SAFETY MANAGEMENT
RAILROAD-HIGHWAY SAFETY MANAGEMENT

COLLISION DIAGRAM

DIVISION:	AREA:
STUDY PERIOD: 10/01/98 - 07/31/04	
DISTANCE: Y-LINE = 150 ft	
ANALYSIS PREPARED BY: CLG	
ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: CLG	
DIAGRAM REVIEWED BY:	
SCALE: NOT TO SCALE	
DATE: 3/15/2005	
LOG NUMBER: 20050249	

SS 07-97-202 After

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DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

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